

**Remarks:**

Claims 1, 11, 19, 21 and 25 have been amended; claims 4, 7, 13, 16, 23, 24, 27 and 28 have been cancelled; and claims 29-36 have been added. Accordingly, claims 1-3, 5-6, 8-12, 14-15, 17-22, 25-26 and 29-36 are currently pending for consideration.

**I. Amendments:**

Amended claim 1 now recites that the polysaccharide has a first cationic substituent having an aromatic group comprising the general formula (I) and a second substituent having no aromatic group comprising the general formula (II). Support for amended claim 1 can be found throughout the specification and, more specifically, in previously presented claims 1, 4 and 7. Accordingly, no new matter has been added.

Amended claim 11 now recites a polysaccharide that has a first cationic substituent having an aromatic group having the general formula (I) and a second substituent having no aromatic group having the general formula (II). Support for amended claim 11 can be found throughout the specification and, more specifically, in previously presented claims 11, 13 and 16. No new matter has been added.

Claim 19 was merely amended to depend from claim 11. As such, no new matter has been added.

Amended claim 21 now recites that the one or more polysaccharides is reacted with at least one cationic first aromatic agent and at least one second non-aromatic agent, wherein the first aromatic agent is a cationic reaction product of epichlorohydrin and a tertiary amine having one or more aromatic groups, and wherein second non-aromatic agents is a cationic reaction product of epichlorohydrin and a tertiary amine having non-aromatic hydrocarbon groups. Support for amended claim 21 can be found throughout the specification and, more specifically, in previously presented claims 21, 23 and 24. No new matter has been added.

Amended claim 25 recites that the product is obtained by reacting a first polysaccharide with at least one first cationic first aromatic agent and a second polysaccharide with at least one second non-aromatic agent, and then mixing the polysaccharides obtained, wherein the first aromatic agent is a cationic reaction product of epichlorohydrin and a tertiary amine having one or more aromatic groups, and wherein second non-aromatic agents is a cationic reaction product of epichlorohydrin and a tertiary amine having non-aromatic hydrocarbon groups. Support for amended claim 25 can be found throughout the specification and, more specifically, in previously presented claims 25, 27 and 28. Again, no new matter has been added.

New claims 29 – 32 specify the degrees of aromatic, non-aromatic and cationic substitution for the polysaccharides according to claims 1 and 21, respectively. Support for these claims can be found in previously presented claim 19 and in the specification a page 7, lines 35-41. No new matter has been added.

## **II. The Invention:**

The presently claimed invention is directed to a cationised polysaccharide product that includes: a polysaccharide having at least one first cationic substituent having an aromatic group comprising the general formula (I) and a second substituent having no aromatic group comprising the general formula (II), in a specified molar ratio (claim 1); or one or more polysaccharides having at least one first cationic substituent having an aromatic group according to general formula (I) and one or more polysaccharides having at least one second substituent having no aromatic group according to general formula (II) (claim 11).

The presently claimed invention is also directed to a cationised polysaccharide product obtained by reacting: one or more polysaccharides with at least one cationic first aromatic agent according to the specified reaction product and at least one second non-aromatic agent according to the specified reaction product, in a specified molar ratio (claim 21); or a first polysaccharide with at least one cationic first aromatic agent according to the specified reaction product and a second

polysaccharide with at least one second non-aromatic agent according to the specified reaction product, and then mixing the polysaccharides obtained (claim 25).

The polysaccharide product containing a combination of aromatic and non-aromatic substituents, as presently claimed, shows improvements in burst strength index, dewatering time and/or retention, when used in a process for the production of paper, compared to prior art polysaccharides used for such a purpose.

### **III. Rejections:**

Claims 1-8, 10-17 and 19-28 stand rejected under 35 U.S.C. § 112, first paragraph, because (according to the Office Action) the specification does not reasonably provide enablement commensurate in scope with the claims. Specifically, the Office Action contends that the specification does not reasonably provide enablement for any aromatic or any non-aromatic substituents and that a person of skill in the art would have to engage in undue experimentation to practice the invention commensurate in scope with the claims. The Applicants respectfully traverse.

In applying the *In re Wands* (8 USPQ2d 1400 (CAFC 1988)) factors, to support its conclusion that a person of skill in the art would have to engage in undue experimentation to practice the claimed invention, the Office Action focuses on and repeatedly contends that the claims are overly broad, i.e., can encompass thousands of permutations, and that there is only one aromatic substituent and one non-aromatic substituent exemplified.

In *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 224 USPQ 400, 413-414 (Fed. Cir. 1984), the court held that the district court did not err in finding the patent specification enabling even though it listed elements that could form thousands of end products some of which may not be operative. It is not a function of the claims to specifically exclude possible inoperative substances. *Id.* at 414. Further, use of only prophetic examples does not automatically make a patent non-enabling. *Id.* at 414.

Moreover, a large number of working examples are not required to satisfy section 112, first paragraph, in the case of broad claims. *In re Strahilevitz*, 212 USPQ 561, 563 (CCPA 1982). The disclosure in the specification can provide the teachings necessary to enable one skilled in the art to practice the invention.

In the instant application, the specification provides instruction as to the selection of the aromatic and non-aromatic substituents and as to how the cationised polysaccharides are prepared. In that regard, the specification teaches that the substituents can be attached by a heteroatom (see page 5, lines 11-24).

The specification also identifies exemplary aromatic groups that can be used in the first substituent (see page 5, lines 25-30). It also identifies preferred cationic aromatic agents that can be used to prepare the cationised polysaccharide products (see page 9, lines 17-27).

The specification also identifies exemplary non-aromatic groups that can be used in the second substituent (see page 6, lines 13-18). It also identifies preferred and more preferred substituents that contain no aromatic group, as well as preferred non-aromatic groups for the preferred substituents (see page 6, lines 19-39). Moreover, it identifies preferred non-aromatic agents that can be used to prepare the cationised polysaccharide products (see page 9, line 33 to page 10, line 24).

As the presently claimed invention now identifies both the aromatic and non-aromatic substituents according to structural formulas (claims 1 and 11) or according to reaction products (claims 21 and 25), it is respectfully submitted that the present claims are enabled by the specification.

Therefore, it is respectfully requested that the rejections of claims 1-8, 10-17 and 19-28 under 35 U.S.C. § 112, first paragraph, be withdrawn.

Claims 19 and 20 stand rejected under 35 U.S.C. § 102(b), as being anticipated by Matsunaga Y et al. (JP 621149702, English Translation). The Applicants respectfully traverse.

As claims 19 and 20 have been amended to depend from claim 11, applicants respectfully submit that this rejection is now moot.

Accordingly, it is respectfully requested that the rejections of claims 19 and 20 under 35 U.S.C. § 102(b), as being anticipated by Matsunaga Y et al., be withdrawn.

Claims 1-28 stand rejected under 35 U.S.C. § 103(a), as being obvious over, Matsunaga et al., in view of Persson et al (WO 99/55964). The Applicants respectfully traverse.

Matsunaga et. al. is directed to a method for preventing the re-solidification of a cationized starch solution used as a strength additive of surface coating agent in the paper making industry.

Applicants respectfully submit that nowhere do Matsunaga et al. disclose, teach or suggest a cationized polysaccharide product that includes a cationic substituent having an aromatic group; or reacting a polysaccharide with a cationic aromatic agent and a non-aromatic agent to form a cationized polysaccharide, as presently claimed. In fact, Matsunaga et al. teach away from adding additional cationizing agent to starch that was cationized with CTA (See p. 6, last sentence of first paragraph).

Persson et al. is directed to a process for the production of paper from a suspension, which includes adding to the suspension a drainage and retention aide that includes a cationic or amphoteric polysaccharide, and forming and dewatering the suspension on a wire. The cationic polysaccharide has a hydrophobic group.

Nowhere do Persson et al. disclose a cationized polysaccharide product which includes a polysaccharide having (i) at least one first cationic substituent having an aromatic group and (ii) at least one second substituent having no aromatic group, as presently claimed.

Consequently, there is no teaching or suggestion in Matsunaga et al. or Persson et al, when read separately or together, of a polysaccharide having both a first cationic substituent having an aromatic group and a second substituent having no aromatic group, as presently claimed. Accordingly, Applicants respectfully submit that the claims (as presently amended) are not rendered obvious by Matsunaga et al., in view of Persson et al..

Moreover, the use of both the first and second substituents provides unexpected results. In that regard, Example 2 (Table 1) of the present invention clearly shows that when comparing the performance of : 1) Ref.3, i.e., a cationic starch being made by reacting native starch with a cationic aromatic agent (represented by 3-chloro-2-hydroxypropyl dimethyl benzyl ammonium chloride); and 2) the invention, i.e., a cationic starch made by reacting native starch with a cationic aromatic agent (represented by 3-chloro-2-hydroxypropyl dimethyl benzyl ammonium chloride) and a non-aromatic agent (represented by 2,3-epoxypropyl trimethyl ammonium chloride), the cationic starch according to the invention gives much better results in terms of Burst Strength Index Increase.

To the contrary, the use of an aromatic compound (benzyl chloride), along with the CTA (as disclosed by Matsunaga et al.), shows no improvement in burst strength. In that regard, a review of Table 1 (on p. 9 of Matsunaga et al.) shows that there is no benefit in terms of Burst strength index when using benzyl chloride (aromatic agent) or not.

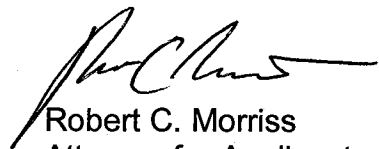
Therefore, it is respectfully submitted that the present invention, which includes the cationic aromatic substituent according to the present claims, shows unexpected results for a process using the polysaccharide.

Accordingly, it is respectfully requested that the rejections of claims 1-28 under 35 U.S.C. § 103(a), as being obvious over Matsunaga et al., in view of Persson et al., be withdrawn.

**Conclusion:**

In light of the foregoing, Applicants respectfully submit that the application as amended is now in proper form for allowance, which action is earnestly solicited. If the Examiner has any questions relating to this Amendment or to this application in general, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,



Robert C. Morriss  
Attorney for Applicants  
Registration No.: 42,910

Akzo Nobel Inc.  
Intellectual Property Dept.  
120 White Plains Road, Suite 300  
Tarrytown, New York 10591  
(914) 333-7450